BIOLOGICAL EVALUATION OF BARK BEETLE INFESTATIONS ON THE OCONEE NATIONAL FOREST, GEORGIA

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ABSTRACT

Higher than normal numbers of pine bark beetle spots (22) on the Oconee National Forest are apparently associated with a sustained drought. While nearly all of these are Ips spp. and turpentine beetle (Dendroctonus terebrans) infestations, they can still pose a serious threat to large areas of stressed timber. Because of the weakened timber, southern pine beetle (Dendroctonus frontalis) may also be a problem in the spring of 1982. Several direct and preventive measures for pine beetles are listed, along with a recommendation for increased surveillance.

INTRODUCTION AND METHODS

After being notified by the Oconee National Forest of numerous areas of dying pine, the Asheville Field Office carried out a biological evaluation during the week of October 12, 1981. The Forest supplied Forest Pest Management (FPM) with a map prepared during a 100 percent aerial sketch map survey conducted on October 8. Areas of discolored trees were marked on a Forest Service map with the estimated number of red trees marked adjacent to each area. Spots were categorized by size class (number of trees) in classes 1-10, 11-25, 26-50, and 50+. FPM conducted ground checks, noting such factors as cause of mortality, volume of infested timber, condition and species of brood, and color of infested trees. This last factor was taken to formulate a ratio to adjust aerial survey data to represent total trees killed on the Forest. Trees in which it was suspected that a different species of beetle than that in the bole might be present were felled and their tops examined. Finally, since bark beetle infestations are often associated with stress factors such as drought and overstocking, National Weather Service records showing precipitation by month were examined retroactive to August 1, 1980 and compared to normal. Basal area measurements were also taken at each area.

RESULTS

Table 1 shows data condensed from the aerial and ground survey. A total of 22 spots were aerially detected with the majority in the smallest size class.[1/] While not all aerially-detected spots in the smallest size category (1-10 trees) were ground checked, several recently-developed small spots were spotted only from the ground, and these were examined. We estimate that in all, 75 percent of all spots were ground checked.

1/ Not all single-tree spots were marked during the aerial survey.

Table 1.--Spots detected by air and ground checked by spot size category.

	----Spot Size Category (Trees)----			
	1-10	11-25	26-50	50+
No. spots found by air	20	1	1	0
No. spots ground checked	15	1	1	0

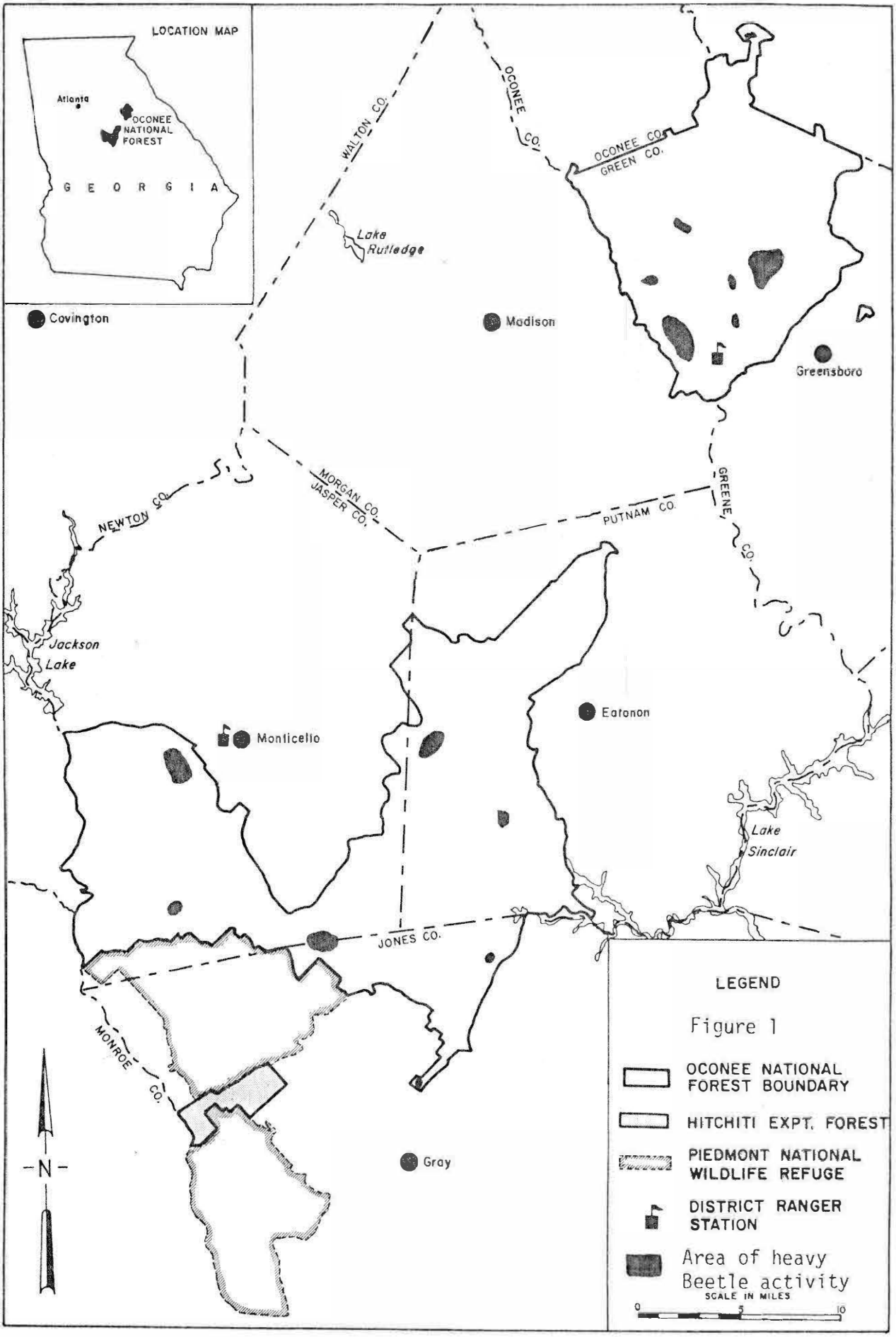
Evidence of all three major types of southern pine bark beetle (Ips spp., black turpentine beetle, and southern pine beetle) was noted during the ground checks. Table 2 shows the number of spots by species of infesting beetle and total active spots by spot size class. In some cases, more than one type of beetle was found in one spot. A total of 10 of 17 ground checked spots contained living brood. No active spots contained southern pine beetle (SPB), although remnants of recent SPB activity were found in the largest spot located on the northern (Redlands) District. Ips and turpentine beetle activity was distributed generally across the Forest (Fig. 1).

Table 2.--Number of ground checked spots by species of infesting beetle and number of spots active by size class.

Size Class (trees)	Ips spp.	Turpentine Beetle	SPB	Mixed	Number Active
1-10	8	4	3	1	8
11-25	0	0	0	1	1
26-50	1	0	0	0	1
50+	0	0	0	0	0
Total	9	4	3	1	10

Due to the very limited number of green infested trees, none of the aerially-detected spots "shifted" to larger spot size categories. Since 80 percent of active spots were in the smallest size class category involving normally secondary[2/] species of beetle, volumes of infested timber were not

2/ Pests which usually attack only stressed timber.


LOCATION MAP
Atlanta
OCONEE NATIONAL FOREST
G E O R G I A
WALTON CO.
OCONEE CO.
OCONEE CO.
GREEN CO.
Lake Rutledge
Covington
Madison
Greensboro
NEWTON CO.
MORGAN CO.
JASPER CO.
PUTNAM CO.
GREENE CO.
Jackson Lake
Monticello
Eatonon
Lake Sinclair
JONES CO.
MONROE CO.
Gray
N
LEGEND
Figure 1
OCONEE NATIONAL FOREST BOUNDARY
HITCHITI EXPT. FOREST
PIEDMONT NATIONAL WILDLIFE REFUGE
DISTRICT RANGER STATION
Area of heavy Beetle activity
SCALE IN MILES
0
5
10

tabulated. In all, ten ground checked spots were associated with lightning-struck trees. Basal area measurements showed that at least five spots occurred in heavily stocked timber with the largest in a clearly overstocked stand.

National Weather Service records show a serious rainfall deficit for the months August 1980 to July 1981 [(the most complete records available at the time of this writing) Fig. 2]. Additionally, this drought has continued to date (personal communication with NWS).

CONCLUSIONS AND RECOMMENDATIONS

Bark beetle infestations on the Oconee National Forest are primarily associated with timber stressed by drought, lightning strikes, and (in a few cases) overstocking.

Lightning strikes are common in late summer, and these trees are rapidly colonized by southern pine bark beetles. Usually beetles confine their activity to damaged trees or perhaps an adjacent, apparently undamaged tree or two. However, due to additional drought-induced stress, beetles are apparently better able to overcome host resistance, and we are seeing a larger number of multiple-tree spots than normal. Nevertheless, spots are still generally small, and most contain no living beetles.

Indications are that none of the bark beetles pose a serious threat to timber on the Oconee National Forest at this time, but the severity of the current drought necessitates an increased awareness of the threat these beetles pose when exposed to stressed trees. While the 30 percent of spots containing overstocked trees is far too high to represent stocking conditions on the Forest as a whole, the data reflect the tendency of beetles to exploit weakness in their host. Of special concern is that one of the larger spots showing SPB egg galleries was found on the Redlands District--an area where SPB activity has been historically very limited.

These two facts--serious drought and discovery of SPB in a "new" area--necessitate increased surveillance by personnel of both FPM and the Oconee National Forest. FPM should schedule an aerial survey and biological evaluation in the spring of 1982.

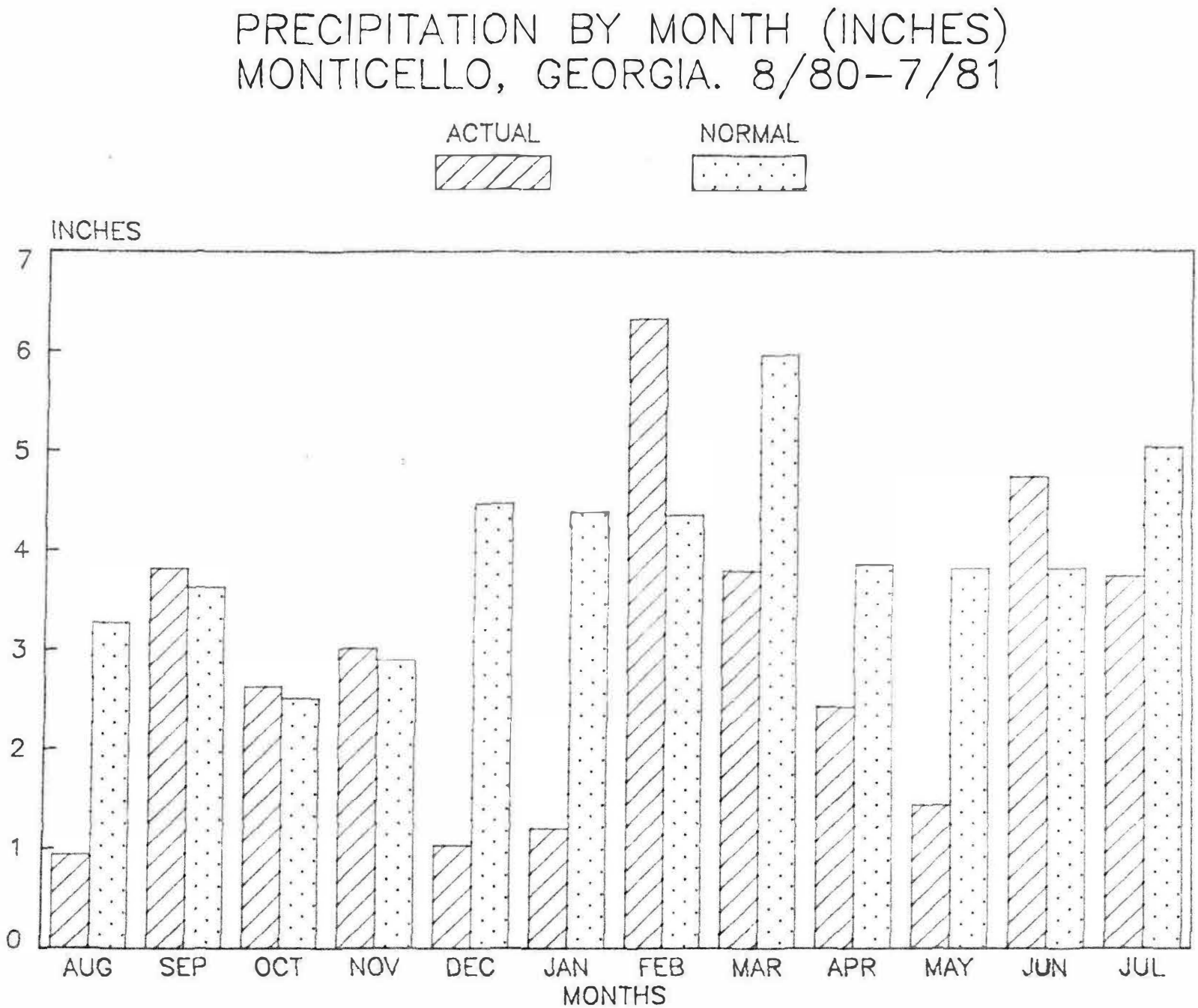
Below are listed direct and indirect control options for Ips spp. and black turpentine beetle. They may be applied at the discretion of the Oconee National Forest. For SPB control recommendations, see a recent SPB biological evaluation (e.g., Hoffard, 1980).

A. Direct Control Options

1. Pile and burn infested trees

All trees should be felled toward the center of the infestation. Tree boles, as well as slash and any infested bark, should be piled in a central area away from uninfested pines and burned until the bark is well charred.

Figure 2


PRECIPITATION BY MONTH (INCHES)
MONTICELLO, GEORGIA. 8/80–7/81
ACTUAL
NORMAL
INCHES
7
6
5
4
3
2
1
0
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
MONTHS

2. Solar radiation exposure

For use when the average daytime temperature is 80° or greater.

a. Direct exposure method - all infested trees should be felled with the boles in a north-south orientation and spread out for optimum exposure to direct sunlight. The trees should be turned after five days so that all surfaces receive exposure to direct sunlight. This method results in a significant buildup of heat beneath the bark, which destroys developing beetle brood.

b. Greenhouse effect method - all infested trees should be felled toward the center of the infestation. Trees may be bucked, piled along with the tops, and then covered by heavy gauge clear polyethylene sheeting. The sheeting should be of sufficient gauge to resist tearing and should be securely anchored to the ground. The plastic traps and holds the heat, which kills the developing brood. Polyethylene sheeting should remain intact for 30 days (Buffam, 1968).

3. Debarking

Trees should be felled and debarked. All bark should be burned to insure destruction of any remaining brood.

B. Indirect Control Options

In addition to the direct control methods listed above, several preventative measures will help minimize Ips population buildups.

1. Minimize damage to trees and site.

Trees under stress are attractive to both Ips and turpentine beetles. In using heavy equipment for road maintenance, building site construction, harvesting, or thinning, use care to minimize root damage and soil compaction.

2. Scatter breeding material during thinning operations.

In addition to breeding in stressed trees, Ips beetles reproduce in the slash from clearing operations. Scattering of the slash promotes rapid desiccation of the tops and limbs, making them unsuitable for beetle breeding purposes. Bolts cut from infested or uninfested trees should not be stacked against or near uninfested trees. The resinous odors may attract beetles resulting in the establishment of a new infestation.

3. Consider delaying thinning and harvesting operations during periods of extreme tree stress.

A certain amount of Ips population buildup in slash is almost inevitable. If these operations are conducted when trees are stressed (drought, flooding, etc.), residual trees may be attacked and killed as a result.

LITERATURE CITED

Buffam, P. E. and D. D. Lucht. Use of polyethylene sheeting for control of Ips spp. in logging debris. J. Econ. Entomol. 61(5): 1465-1466, 1968.

Hoffard, W. H. Biological evaluation of SPB infestations on the Oconee National Forest. USDA Forest Service, Report 80-1-10, 1980.